What is Claimed Is:

1. In a method for producing a glycosylated polypeptide having the amino acid coding sequence of alpah1-antitrypsin in the yeast Pichia pastoris in a fermentor, the improvement which comprises the step of culturing a strain of said yeast selected from the group consisting of KM71, X33 and SMD1168H, which strain comprises an expression cassette that contains a copy of a DNA sequence operably encoding said alpha1-antitrypsin and operably associated with DNA encoding the yeast Saccharomyces carevisiae alpha mating factor pre-pro sequence under the regulation of a promoter obtained from a methanol responsive gene of Pichia pastoris at a pH of about 5 to 6.8.

2. The method of claim 1 in which the amino acid coding sequence of alpha1-antitrypsin/alpha mating factors pre-pro fusion protein is operatively linked to an inducible AOX1 promoter.

3. The method of claim 1 wherein the DNA sequence encoding alpha1-antitrypsin is operably linked to a DNA sequence encoding Saccharomyces Cerevisiae alpha mating factor pre-pro sequence such that a fusion protein is produced that comprises the alpha1-antitrypsin amino acid sequence linked to a Saccharomyces cerevisiae secretin signal and that the coding sequence for the fusion protein is operably linked said promoter.

4. The method of claim 1 wherein the expression cassette is on a DNA fragment which comprises 3' and 5' flanking sequences having sufficient homology to target sequence in the target yeast host cell for the DNA fragment to effect site directed integration of the DNA fragment into the target sequence.

5. The method of claim 1 wherein the expression cassette includes in the direction of transcription a transcriptional terminator obtained from the Pichia pastoris gene.

6. The method of claim 1 wherein said Pichia pastoris strain is KM71.

7. The method of claim 1 wherein said Pichia pastoris strain is X33.

8. The method of claim 1 wherein said Pichia pastoris strain is SMD1168H.

9. The method of claim 1 wherein the coding sequence for alpha1-antitrypsin is cloned into a pGAPZ alpha vector with AOX1 sequence.

10. A method for producing glycosylated alpha1-antitrypsin which comprises the steps of:

(i) culturing the cells of a Pichia pastoris strain selected from the group consisting of KM71, SMD1168H and X33 comprising an expression vector encoding alpha1-antitrypsin in a fermentor at a pH between 5 and 6.8, and

(ii) introducing expression of the alpha1-antitrypsin coding sequence from the expression vector to produce alpha1-antitrypsin wherein the coding sequence has been operatively linked the methanol inducible AOX1 promoter.

11. The method of claim 10 wherein expression vector is selected from the group consisting of pGAPZ and pGPICZ.

12. A process for producing glycosylated alpha1-antitrypsin comprising the steps of culturing at a pH between 5 and 6.8 the cells of a Pichia pastoris strain selected from the group consisting of KM71, and SMD1168H said strains comprising a DNA construct having one or more copies of an expression cassette that contains a sequence of nucleotides encoding alpha1-antitrypsin and a promoter region from Pichia pastoris AOX1 gene operably linked to the sequence of nucleotides that encodes glycosylated alpha1-antitrypsin, said construct further comprising the DNA sequence of a vector comprising plasmid pGAPZ alpha.